D 301.81:
26/7

UNIVERSITY OF FLORIDA LIBRARIES
JUL 1976
DOCUMENTS DEPT.

Combat Crew

strategic air command

★★★★

JULY 1976

Combat Crew

strategic air command

Contents . . .

Articles

Tanker Task Force 4
Jet Engine Inflight Monitoring . 8
Scope Interpretation 14
Hangar Flying 18

Features

The Out Basket 12
Professional Performers 22
Training Topics 24
Flying Safety Rate 25
Big Instrument 26
Hall of Fame 30
SAC Safety Screen 31

UNIV. OF FLORIDA LIBS.
DOCUMENTS
DEPARTMENT
U.S. DEPOSITORY

ON OUR COVER

Combat Crew salutes the North American bald eagle, symbol of our nation's strength.

FLARE

GEN. RUSSELL E. DOUGHERTY
COMMANDER IN CHIEF, SAC

MAJ. GEN. JOHN W. BURKHART
Deputy Chief of Staff, Operations

COL. JESSE S. HOCKER
Director of Safety

STAFF

LT. COL. RICHARD W. BLATTER
Editor

G. FRANCIS FARRELL
Associate Editor

A1C GERALD F. MORIARTY
Art Editor

MARY JANE ABBOUD
Editorial Assistant

(26)
XXVI

SACRP 127-1 VOL. ~~XXVII~~, NO. 7 JULY 1976

COMBAT CREW is an internal publication of the Stragegic Air Command with the sole purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all accidents printed herein may not be construed as incrimination under Articel 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with accident stories are fictitous. Written permission must be obtained from Headquarters, Strategic Air Command, before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF. Contributions are encouraged, as well as comments and criticisms. Direct correspondence with the Editor is authorized. Address correspondence to Editor, COMBAT CREW, Hq. SAC (DOSE), Offutt AFB, Ne. 68113.

D 301.81: 26/7

CINCSAC COMMENTS

In my recent visits to SAC aircraft and missile units, I have heard a certain complaint from young officer crew members (usually Captains) often enough to disturb me greatly, and to prompt me to discuss it with you. The phrase goes something like this: "I've just got to get off this combat crew soon, get some PME, and get a good staff job, or I'll never get promoted." I have talked about this with the Chief of Staff and the Deputy Chief of Staff Personnel, USAF — we agree that the fact and the perspective giving rise to this concern must be addressed.

Professional Military Education, advanced degrees, and various levels of staff experience are very valuable aspects of a combat crew officer's career, and I don't want to demean them in any respect. But . . . they are just that — valuable aspects, not ends unto themselves. I think our young officers should be advised not to let their perspectives get out of balance — nor their ambitions get out of sequence. For the flying officer and the trained missileman, combat crew duty is not just a way-stop to something else — it is the bedrock preparation for his entire career — and I am going to do everything in my power to insure that there is no better way to progress to Major in this command and our Air Force than to be an absolutely expert crew member, enjoying the respect and the recognition of your commanders in your crew duty.

If you are presently on a combat crew, doing a completely professional job, I want you to know that this command will provide no better way for you to be recognized, evaluated and promoted to field grade. There will be no requirement for you to seek assignments other than combat crew, instructor or evaluator duty to progress to field grade.

If you are a crew copilot, navigator or deputy crew commander in missiles, then your primary objective should be to be the very best in your profession so that you can move rapidly up to senior crew positions — Aircraft Commander, Radar Navigator, or Missile Crew Commander. Then you'll have the basis for going on to staff positions integral to your operational specialty, professional schools, supplemental duty, and operational or support command roles. It may be that the Air Force will have other and early need of your special talents elsewhere along the way, but you should not be discouraged if you remain in crew duties — and in this command you cannot prepare yourself for advancement in any better way than to develop your crew skills and experience and be the very best there is in your specialty.

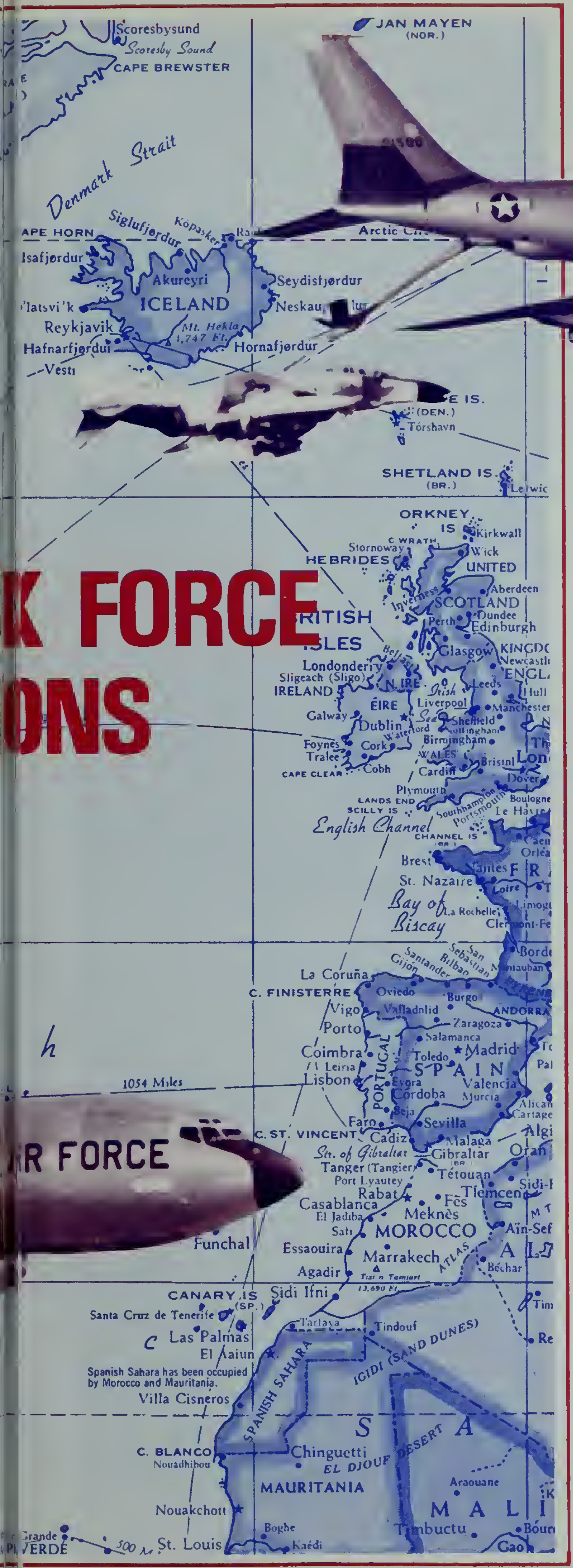
Implementation of the new OER system has been followed by applause from some, confusion and discouragement on the part of others — as is inevitable with any such innovation. But, remember, this OER system is Command and Air Force-wide . . . it applies to everyone and it will not be applied selectively; the entire Air Force is using this system. It will take a few cycles for the system to prove itself, but I think it will prove a useful system and those that produce will not be penalized. In regard to the principal point made above, it should prove particularly valuable in one aspect . . . it should allow us to put a high premium on superior duty performance — where it should be — and to

Continued on Page 21

PLANNING AND PREPARATION ADD UP TO SAFETY IN ...

TANKER TAS
OPERAT

K FORCE
ONS



Colonel Kenneth M. Patterson
Deputy Commander for Operations
42 Bombardment Wing
Loring AFB, Maine

Located in the rolling pine-studed hills where Maine's Northern Aroostook county, juts into Canadian New Brunswick, Loring Air Force Base is probably best known for its formidable winters. This reputation is not unearned. With a climatological average of 91 inches snowfall and temperatures that plummet into the minus 30s, flying operations at Loring can be a real challenge. Loring's location of 46-57N 67-54W however, has an additional significance. It is almost directly aligned with the northern fighter deployment routes to Europe.

Each year TAC and the Air National Guard deploy a substantial part of their fighter aircraft inventory and each year the big computer at TAC spits out a voluminous selection of receiver flight plans running between the CONUS and Europe, roughly along the line of 50 degrees north latitude. When SAC gets the charter for tanker support, a certain obvious fact catches the eye of the mission coordinator at CINCSAC/DOOK; the distance from Loring to the mid-Atlantic ARCP is shorter than for any other base. Usually about 200 miles shorter than from Pease or Plattsburgh. In practice, the difference is even greater. In accordance with CINCSAC/DOO Message 16/2152Z Oct 75, overwater flights in Gander ACC Domestic airspace must be planned along or north of H/L 500. Compliance means that missions launched from the nearest other task force bases must fly north approximately one hour before turning east. Since a similar procedure is necessary on the return route, Loring Task Force tankers can offload about 20,000 pounds more fuel while escorting fighters to or from a mid-Atlantic ARCP. Primarily because of these factors, Loring served as a launch base for seven tanker task forces and 15 Coronet East missions in the last half of 1975.

The magnitude of a task force operation can best be understood by a look at the aircraft, crews, support facilities, and staff planning involved. CRESTED CAP 75 Charlie, for instance, supported the movement of 48 F-4 aircraft (two squadrons) from the Federal Republic of Germany to

Holloman AFB, New Mexico. This operation was supported by three tanker launch bases on two successive days, redeploying 24 fighters per day.

An operation of this size is commanded by a tanker task force commander, who is appointed by the numbered Air Force responsible for planning the mission, but who works directly for CINCSAC once the mission is executed. He directs the mission from the designated task force base (Loring in this case) and has a deputy commander for Orbit forces working for him at each of the other tanker launch bases (Torrejon and Grissom).

The 24 fighters per day were launched in four flights of six each. Each receiver flight launched and rendezvoused with a cell of five Torrejon Orbit Force tankers just prior to coast out from the United Kingdom. After completing three refuelings, the four wingmen in the tanker cell turned toward Torrejon. The leader and escort tanker took all six chicks, descended 2,000 feet below base air refueling altitude and made a "tanker-on-tanker" rendezvous with a cell of four Loring KC-135s at 50 North, 33 West. The Loring cells completed two refuelings for each of the six receivers and cleared track over Gander TACAN. The Grissom Orbit Force, with cells of three tankers each, rendezvoused with the receiver flights over the Bangor, Maine, TACAN and provided enough fuel for nonstop flight to Holloman.

If you've been counting as you read this, you've noticed that a lot of aircraft were involved in this one redeployment. On each of 2 days TAC put up four flights of six receivers, while the Torrejon Orbit Force put up four flights of five tankers; the Loring Tanker Task Force put up four flights of four, and the Grissom Orbit Force put up four flights of three. That stacks up to 48 tankers and 24 fighters each day or 144 aircraft and crews in all. That's more than four average size SAC Wings! Now add the maintenance support necessary to launch such a force. Next throw in weather considerations involving two receiver and three tanker launch bases, abort bases for each refueling, and recovery bases with alternates. Also needed are bingo fuel or fuel reserve considerations for each of the above bases. Then add weather and timing considerations for three rendezvous scattered over a 5,000 mile track, procedures for providing spare aircraft, and the staff planning necessary to build and brief such a mission with reasonable assurance that everything will work. If you have digested all that, you're starting to understand some of the basic responsibilities of a task force commander.

The Commander's first responsibility, chronologically speaking, is for mission planning. This begins with a feasibility study to verify that distances and offloads on the initial TAC computer flight plan are compatible with numbers of tankers and refueling ratios programmed in the SAC and numbered air force tasking. This study is normally based on 90% worst winds for the month of the mission. Fuel reserves at Loring are particularly critical because the nearest alternate is nearly an hour away.

Since a lot of fighters will be a long way from land, planning usually provides for getting all fighters to the CONUS if one tanker per cell should air abort. Normally this is done by making the leader of each cell a combination air spare and escort tanker. He escorts receivers to the next ARCP if the route is overwater or if receivers do not have INS, and his offload is available in case of an emergency. If all planning factors check out with safe fuel reserves, a second flight plan is built using 50% worst planning winds and an altitude reservation request is submitted to the Central Airspace Reservation Facility (CARF) in Washington DC.

Approval of the altitude reservation flight plan requires coordination with similar agencies in Europe (EUCARF) and Canada (ARCO). Because of the time involved, the request must be submitted a minimum of 15 days before the mission is flown. The task force commander normally arrives at his base of operation only four or five days before mission launch. Consequently he must track the mission planning efforts of his staff by phone or message. Deputy commanders for orbit forces and task force base project officers are normally selected from local resources and are tasked to direct this planning in the Commander's absence. It is important that highly competent officers be selected for these positions. A mistake could seriously jeopardize the mission or maybe even get some crews wet!

Once the project officer has mission planning squared away to the Commander's satisfaction and has coordinated any needed changes with higher headquarters, its usually time to get the crew and VIP reception plans ready. A dozen or more TDY crews may be inbound. They must be met by qualified people, billeted, fed, transported, briefed, etc. The reception a TDY crew gets is particularly important since it will set the tone for the whole task force operation. Crew performance is probably the single factor most critical to task force success. Make sure the crews are treated right. Let them know that the task force staff is running a first class operation; an operation worthy of the best they can give. A meeting including aircraft maintenance supervisors and all base support agencies, conducted the week before by the project officer, will iron out a lot of problems and eliminate a lot of embarrassment when crews start arriving.

Project officers will want to be prepared for arrival of the task force commander and any commander trainees, all of whom may be arriving with input crews. In addition to routine matters like his quarters and wheels, the commander will want to be briefed on crew qualifications, cell composition, aircraft maintenance, and status of any special actions he may have directed. Most task force commanders, for example, want crew input messages well screened, want cell lead crews carefully selected on the basis of both pilot and navigator qualifications, and want to verify that only fully qualified crew members will fly in crew positions during the mission. The commander will also want to review the general mission briefing and may want the briefing planned so that maintenance personnel can attend, as well as the flight crews.

In addition to gaining a great deal of planning experience, the 42nd Bomb Wing has learned a lot about actually flying tanker task force operations. Referring to some of these, in mission sequence, a good place to start would be with the use of ground spares. Like many task force operations, we initially used compression spare procedures. If number two aircraft in the first cell aborted, three would become two, four would become three and the leader of the next cell would become number four. This however, proved totally unsatisfactory. First of all, our carefully selected cell lead crews did not lead cells. Less experienced crews that had been selected as wingmen suddenly were in the lead. Furthermore, many crews went to one cell leader briefing and then flew in a different cell. To solve this

Continued on Page 20

ENGINE INFLIGHT MONITORING

Lt Col James L. Pettigrew
CMSgt Robert M. McCord
HQ SAC/LGME

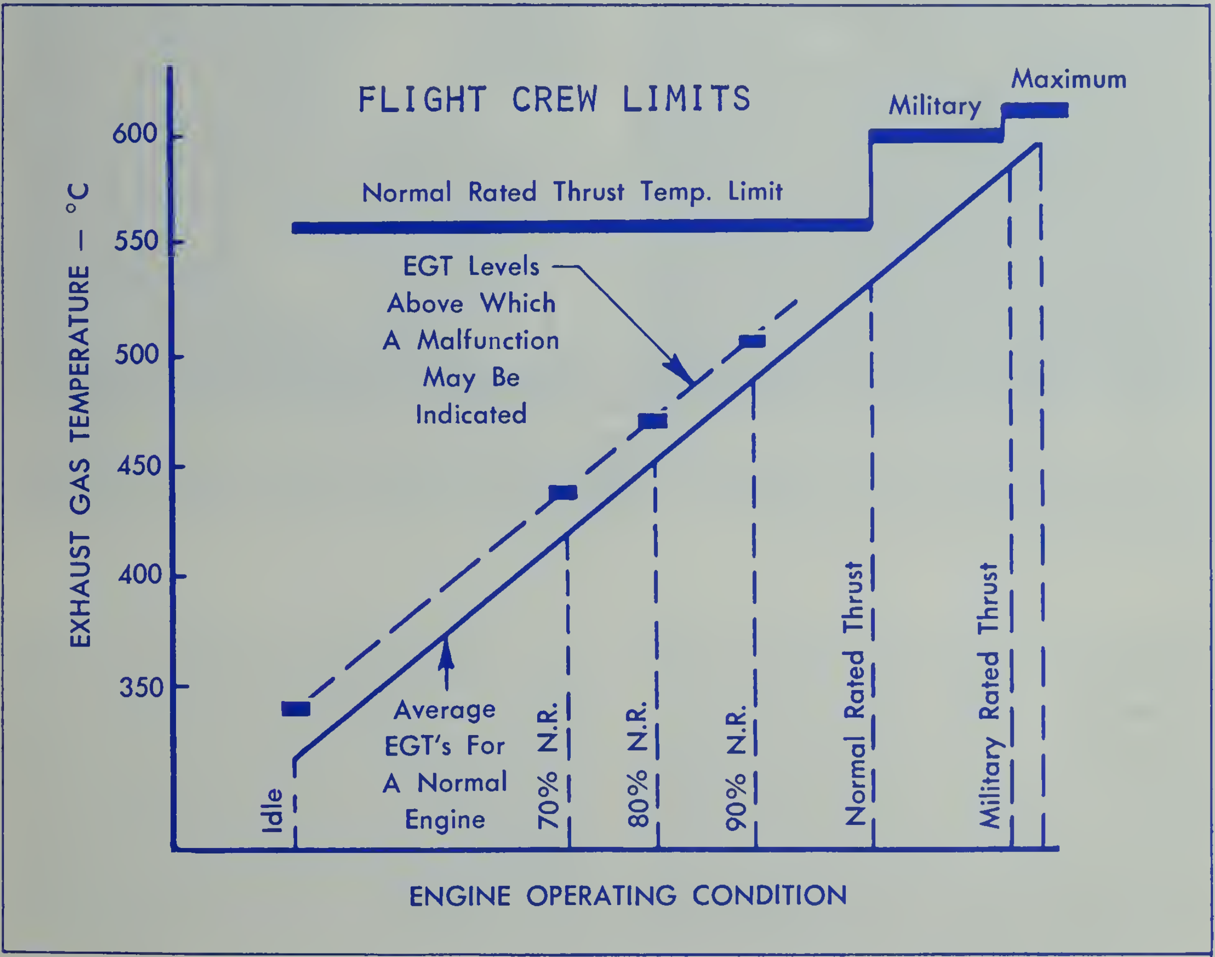
The old sayings, "too soon old and too late smart," or "hindsight is 20-20," could apply to any of us regardless of occupation. If we had only done it differently, things wouldn't have turned out the way they did.

We in the jet engine business are no different, but we think we have discovered the secret to predicting impending failure which can be conducive to longer life. Unlike Ponce de Leon, however, we are seeking longer engine hot section life which can be achieved only if the existing condition of each engine is known. To know each engine's internal health we need the flight crew's help for about 10 minutes each flight and from there on we'll do the rest.

In order to monitor individual engine condition, we have developed a simplified system of engine performance trending. By comparing inflight cockpit instrument readings for RPM, EGT, and fuel flow at NRT EPR, we can detect initial deterioration and predict impending engine failure — even when the engine indications are within the Dash One limits. Figure 1 illustrates how normal engines operate well below the published flight crew limits.

The ability to identify engine deterioration early while the engine operates reliably within flight crew limits is based on the consistent repeatability found in the performance parameters of turbojet engines with constant area exhaust nozzles. The efficiency of that engine's internal components can change only when there is a change in the physical dimensions of the engine components. Deterioration is functionally related to physical changes in the

FIGURE 1 — The relationship between flight crew limits and EGT for a normal engine operating at selected thrust ratings.



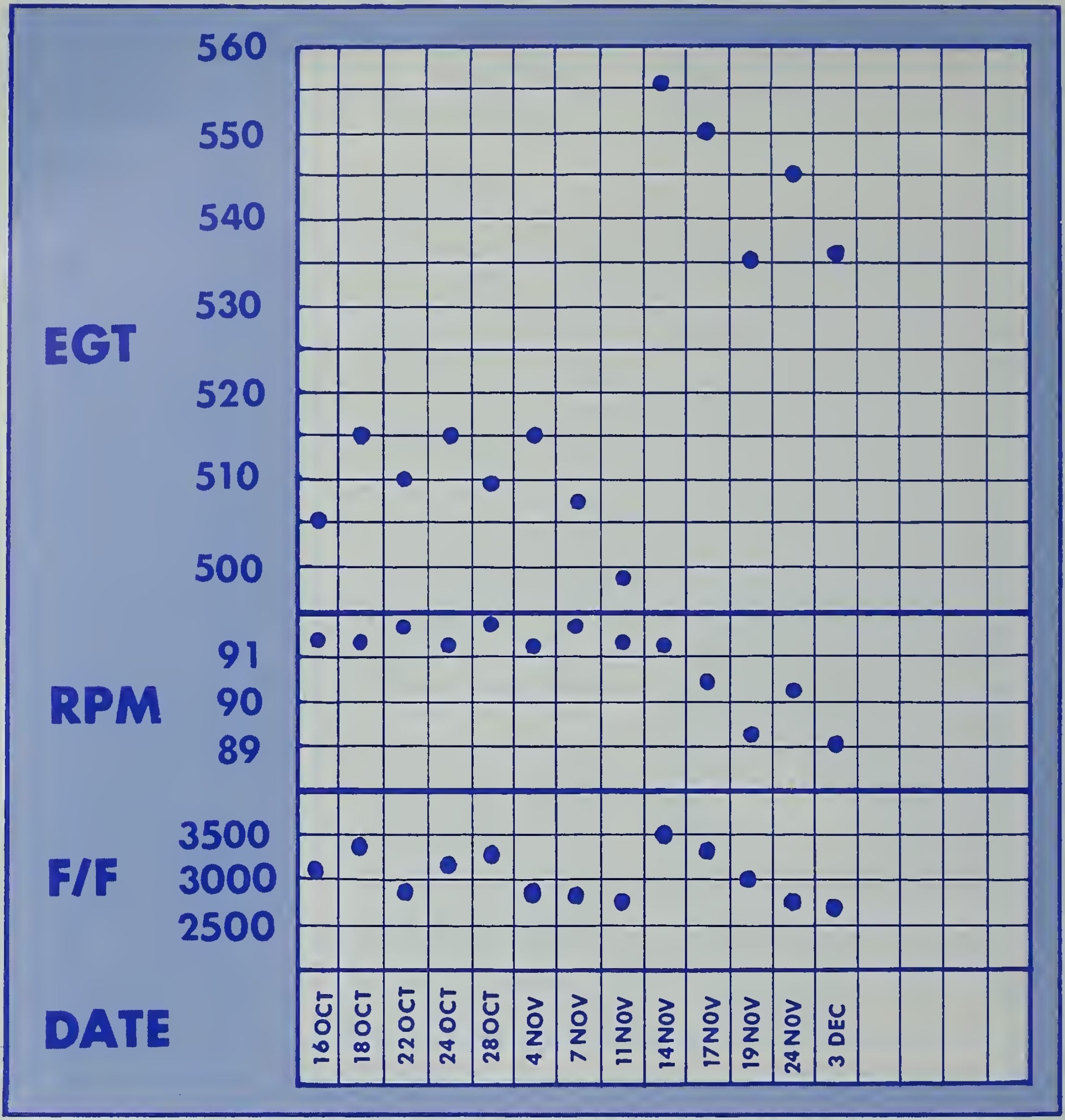


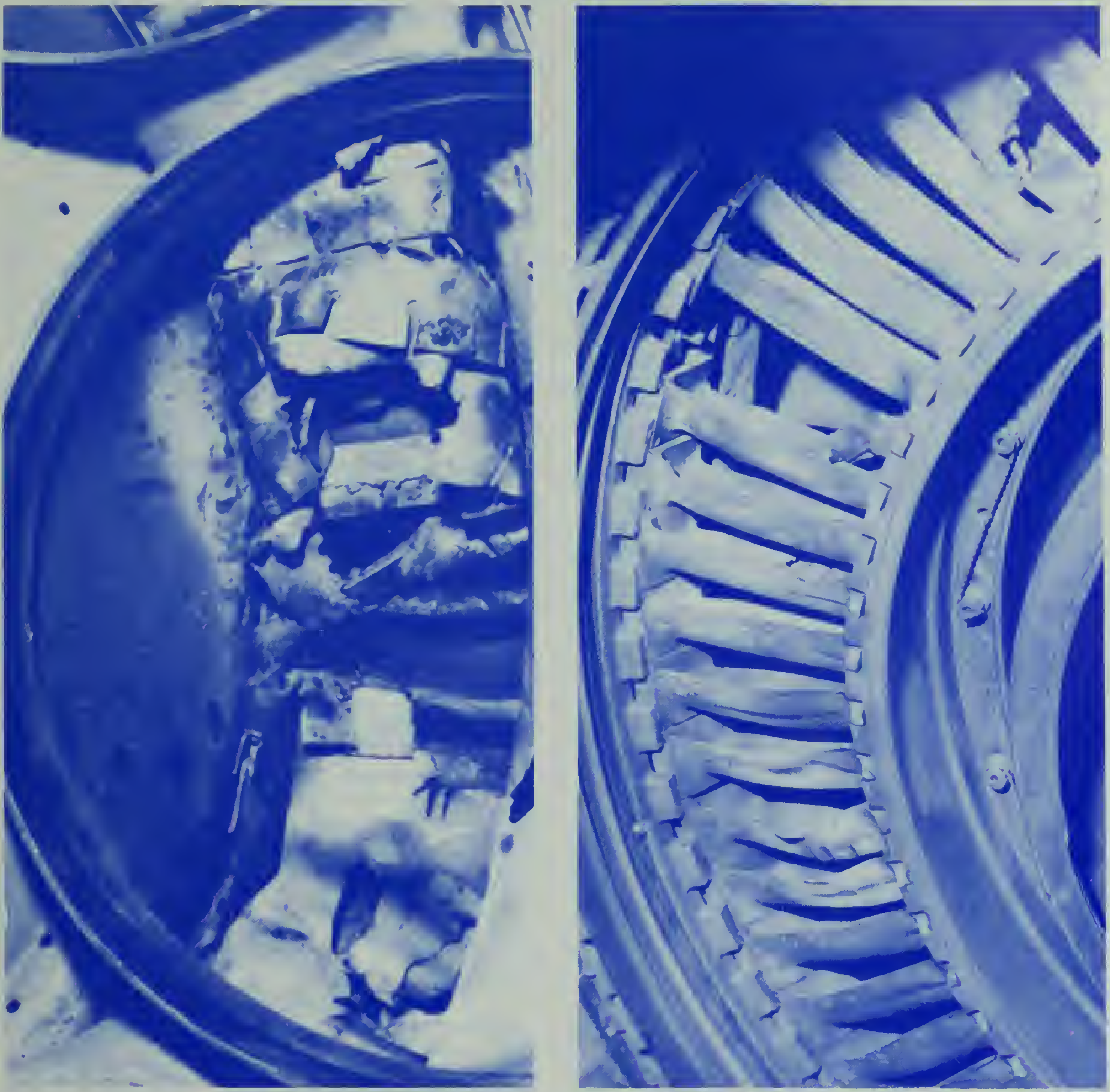
FIGURE 2—This actual trend plot from a -135 test unit identified an unsatisfactory trend in RPM and excessive scatter in EGT even though all values were within flight manual limits. The EGT scatter can be attributed to the changes in first stage turbine nozzle area associated with the combustion liner blocking the flow area and then gradually burning away during continued operation. The trend chart also shows that the engine was flown more than 25 hours after the can failure without an AFTO 781 writeup.

components, therefore, detection of small performance changes can identify potential engine problems such as parts bending, bowing, burning, etc. while the engine is still operationally satisfactory.

Identification of potential failure caused by premature deterioration can direct maintenance attention to engines with the lowest reliability potential and the highest probability of inflight failure.

Armed with the knowledge of which engine is experiencing internal change, we can apply preventive maintenance techniques to increase engine life and reduce the incidence of inflight engine shutdowns. Repair of engine deterioration in its early stages will result in improved operational reliability, improved flight safety, and a substantial reduction in maintenance cost associated with repairing problems before secondary failure damage occurs.

Mechanical and electronic automated engine inflight monitoring systems come in all shapes and capabilities, but they all bear one distinct characteristic: high cost. If we can successfully accomplish the same function by using only 10 minutes of your time, and in turn, save millions of dollars in re-



FIGURES 3, 4—The excessive scatter in EGT and the unsatisfactory RPM trend in Figure 2 reflect the damage caused by the combustion can inner cone when it impacted the first stage turbine stator vanes. Left Photo. The right photo shows damage to the aft side of the first stage turbine stator vanes. By correcting this damage before catastrophic failures, maintenance personnel avoided an estimated $50,000 in replacement parts cost and also increased aircrew safety.

placement parts, and reduce inflight shutdowns, we think it's worth it. How about you?

The SAC Aircraft Engineering Division has been evaluating the potential of applying trending techniques to SAC propulsion systems since 1969. An initial study completed in 1971 of airline engine trend analysis programs concluded that trending could be used as a SAC maintenance tool, but that it appeared to be marginally cost effective because of the high cost of required computer capability needed to normalize the data for trending.

In the early stages of the current program John Garner, propulsion specialist, 8AF LGMS, Barksdale, asked LGME engineers to tell him how to produce usable trend plots without complex calculation. His request caused LGME engineers to innovate methods that could normalize inflight data without the daily requirement for complex calculations. The innovations were based on detailed knowledge of airline trending programs provided LGME by American and Trans World Airlines. The resulting methods produce usable trend plots for SAC propulsion systems without the requirement of expensive computer capability.

Ability to interpret engine conditions from shifts in the trend plots has been developed during a service tests with the help of participating maintenance personnel. For example, TSgt Charles N. Annette, 55SRW/FMS was especially successful in interpreting shifts in the trend plots and improvising troubleshooting methods to pinpoint the engine deterioration which caused the shifts.

The simplified engine performance trending technique has been under service tests since Oct. 1975 at four K/R/EC-135 wings (55SRW, Offutt; 2BMW, Barksdale; 17 BMW, Beale; and 384ARW, McConnell). One wing hit pay dirt early in the service test when a trend plot identified a potential failure. All cockpit indications had been within the Dash One limits, therefore, there was no flight crew writeup. After ground tests verified the observed trend condition, the engine was removed and the teardown revealed a combustion chamber inner liner failure. (See figures 2-4). Had the engine continued in service, a catastrophic failure of the turbine wheels would probably have resulted.

During the service tests, SAC monitoring personnel observed several other adverse trends which signaled internal engine degradation. Repair of the engine deterioration/damage has prevented several catastrophic engine failures. In these cases, the engines were operating within flight manual limits and were not written up by flight crews.

In current AF maintenance practice, engine condition is assumed to be satisfactory for specified hard time intervals; unless of course, the flight crew identifies a malfunction with an AFTO 781 writeup. More than half of our J57-59W engines are showing high levels of deterioration at specified inspection intervals. Once turned on by the flight crew writeup, maintenance specialists use sophisticated test equipment to troubleshoot for the cause of the reported engine problem.

Flight crew criteria for writing up an engine are the Dash One limitations. These limits are set to pick up only extremely serious cases of engine deterioration. The magnitude of difference between normal operation and published limits is such that significant deterioration can occur before exceeding limits.

Our service test has shown that we can consistently detect changes in engine performance which can alert us to deterioration and impending failure. Early repair can reduce parts replacement, can save maintenance dollars and can also increase flight safety. During the service test, identification of seven serious cases of internal engine deterioration early enough to prevent additional damage has, we estimate, avoided $250,000 in cost for new replacement parts. The cost in man-hours associated with data handling (collecting, correcting, and interpreting) during the same period was less than one-tenth of that amount.

As an additional benefit of the service test, more than 50 instrument systems and engine control systems were identified as operating outside technical standards and were repaired. Placing dollar values on correcting these deviations is subjective at best, but it is certain that as an engine's EGT increases, its useful life decreases.

SAC plans to expand the engine inflight monitoring program in the near future to all bases that possess -135s. The longer range plan calls for the program to be initiated in the B-52 fleet in early 1977. When the expanded program is initiated at your base, here's how it will work.

One time during a four-hour flight, when operating between 24,000 and 36,000 feet, we will ask you to observe and log specific flight conditions and engine parameters. Stable cruise conditions at NRT EPR will be maintained by setting NRT on two engines and using the others to maintain the desired cruise airspeed. The step by step sequence will be as follows:

a. Test two symmetrical engines at a time (outboards first). Turn off the bleed air and anti-ice valves on the test engines.

b. Adjust test engine throttles to obtain NRT EPR; adjust remaining throttles to maintain the previously recorded Mach number.

c. After aircraft and engine instruments are stabilized for at least one minute at given EPR and prerecorded Mach number, record actual EPR, RPM, EGT, fuel flow, and throttle position using number one throttle as reference. These readings will be entered on a test data sheet.

d. Return test engines to normal power conditions.

e. Repeat steps a through d on the remaining engines.

f. After flight, turn your test data sheet in to the maintenance debriefer.

If the current profitable trend continues in the expanded test, we hope to incorporate the method into technical manuals.

The innovations which reduced the cost of monitoring engine performance to a few manhours per wing per day provided maintenance the cost effective capability to use the airline proven engine trending technique without the use of costly computer time. An added maintenance capability to predict catastrophic engine failure is available when the monitoring technique is used. For the cost of a small daily effort on the part of flight crews and maintenance personnel, the potential benefits from daily use of engine monitoring include:

- Increased flight safety from better engine reliability.
- Fewer in-flight shutdowns. Less unscheduled maintenance.

- Fewer fuel dumps and less loss of training.
- More accurate cockpit instrument systems which will improve flight crew ability to detect problems.
- A followup performance monitoring capability which can assist in the quality control of maintenance repair work.
- Reduced maintanance costs.
- Premature deterioration identified shortly after it occurs.
- Reduced secondary damage which lowers replacement parts costs.

ABOUT THE AUTHORS.

Lt Col James L. Pettigrew is a staff reliability and maintainability engineer assigned to HQ SAC/LGME, Aircraft Engineering Division. He is a graduate of Clemson University with a masters degree in engineering. He is also a certified professional engineer. Upon entering the Air Force in 1958, he attended UPT and received a pilot rating in August 1959. He is now a command pilot and also holds an FAA Airline Transport Pilot rating and both FAA Flight and Ground Instructor ratings. Lt Col Pettigrew has authored several technical papers on engineering problems and techniques and has presented a paper titled, "Engine Condition Monitoring with Available Tools" to the 6th Annual Logistics Management Symposium.

CMSgt Robert M. McCord is a propulsion engineering projects officer assigned to Hq SAC/LGME, Aircraft Engineering Division. He has extensive field experience in propulsion maintenance and has been a propulsion branch chief in three different MAJCOMS. He is the author of "Noise Suppression-Tactical Air Command-1970" and "Propulsion Management Instability-US Air Force." He has studied under USAFI, and attended North Carolina State University and Hampton Institute. CMSgt McCord is a graduate of the USAF Senior NCO Academy and was selected as the 8AF Outstanding NCO for 1975.

Editor's note: Just prior to press run of this issue a test base reported additional data shifts on two engines. These two engines were on the same wing of one of their aircraft. Further investigation and troubleshooting revealed serious overtemperature operation of the two engines. Due to cockpit EGT indicator errors, there had been no inflight discrepancies reported by the aircrews who had been flying the aircraft. Teardown on one engine (400 hours since overhaul) revealed the inception of serious conditions (leaking fuel manifold) but only minor damage to the hot section which could be easily repaired — about $1000 for the engine. Teardown on the other engine (1940 hours since overhaul) revealed a bad fuel manifold and serious burning of first stage turbine stator vanes. Repair parts cost about $15,000 for this engine. Had the failures and overtemperature conditions not been identified early, all the hot section parts would have quickly deteriorated to scrap under continued operation. One replacement hot section costs approximately $56,000.

OUT BASKET

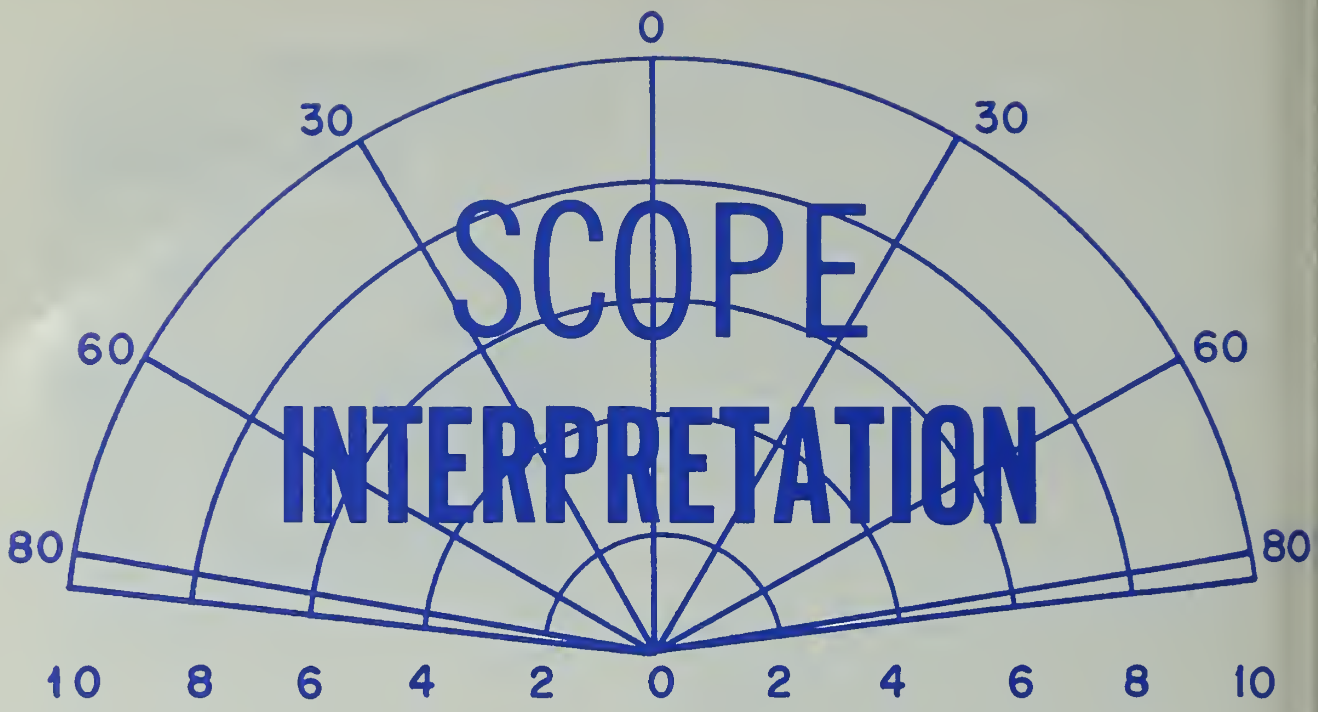
1976 SAC Safety Seminar — The 1976 SAC Safety Seminar will be held at Carswell AFB on 19-21 October. Two days (18 and 22 Oct) are planned for travel to and from Carswell. HQ SAC Project Officer is Maj Robert A. White HQ SAC/DOSG AV 271-2610/4580. The seminar program and agenda items are being formulated and will be released in the near future. Again this year, Operations Training Support Laboratory (OTSL) will be the host organization at Carswell.

From the Director of Aerospace Safety, Norton AFB: "During the December 1975 USAF Worldwide Inspection and Safety Conference, we agreed to produce an Additional Duty Safety Personnel Training Course for Air Force-wide distribution. Problems were encountered in development of the course, and we were unable to meet our April 1976 target date.

"The course initially will be issued as a 4-part, ¾-inch video cassette. This presentation will be supplemented with a workbook which will include instructional objectives and tests. A limited number of 16mm color prints also will be distributed later. The 4-part video cassette program should be in the field by 30 July 1976."

FAC Reunion (All FACers past and present)
17-19 Sept 1976
Sheraton Hotel, San Antonio, Texas
For information, contact:
Capt Gary Pointer
2102 Peachblossom Dr.
San Antonio, Texas 78247
Autovon: 487-5697

SCOPE INTERPRETATION



Sgt. Edward A. Ranzenbach
668 Bomb Squadron
Griffiss AFB N.Y. 13440

Our B-52 has just climbed out of low level, and we're at flight level 250, awaiting clearance to 310. It's just after 2 a.m. and things are pretty quiet as we cruise along. Center calls:

"Skip-21, Boston Center, climb and maintain flight level 310, report when level."

"Rog, 310 for Skip-21."

"Pilot, Nav, passing 270 for 310."

"Roger Nav."

"Pilot, Gunner, 'Bogie', 4:30 high at 9,000 yards. It looks like he'll collide if he continues."

"Rog Guns, keep me advised."

"Pilot, Nav, 500 feet to level."

"Pilot, Gunner, 'Bogie' still at 4:30, now level at 6,000 yards, still on a collision course."

"Rog Guns."

"Boston center, Skip-21 level 310, we have an aircraft approaching from our 4:30 position. Please verify assigned altitude."

"Roger 21, please standby."

"Pilot, Gunner, 'Bogie' 4:30 level at 2,000 yards. Pilot break right and dive."

Could this be your "bird"? If it is, you've just avoided a mid-air. Due to the gunner's ability to determine accurately the flight path of an approaching aircraft, and to call the proper maneuver, he just saved two aerospace vehicles, and more important than that, an unknown number of lives.

In recent months the number of mid-airs, and near misses has climbed at an alarming rate. Although the primary responsibility of spotting and responding to other aircraft lies with the pilots, it would be to each crew member's advantage to use every means at his disposal to assist in this task.

For the gunner this means using his fire control radar to monitor for crossing and passing aircraft. The fire control system was primarily designed to acquire and destroy any attacking aircraft, but when used in peacetime it can be a valuable tool in maintaining safe aircraft clearances. But the fire control system is not without flaw. The world is round and has depth, but the radar scope is square and flat. This can cause a varied number of problems in determining the flight path of an approaching aircraft.

The B scope is a rectangular representation of the azimuth and range plane of the radar zone of coverage. If the corresponding azimuth and range plane could be seen outside the airplane, it would look something like the wedge shape in figure 1a. The azimuth and range coordinates (scribe lines) on the B scope, correspond accurately with the coordinates of the wedge. Because the B scope is rectangular, it represents a distorted view of the approaching aircraft's actions. A simplified view of how the 166 degrees of radar coverage is transformed into a rectangular presentation can be found in figures 1b and 1c.

The point of the wedge, (0 yards) is expanded until it becomes the horizontal line at the bottom of the B scope. As this point was expanded, the outside arc, (10,000 yards) was contracted and flattened until it became the horizontal line at the top of the B scope, still representing 10,000 yards. This expansion of the point, and contraction of the arc caused the fanned out azimuth lines of the wedge to become the vertical azimuth lines of the B scope.

Three things should be noted concerning this change from a wedge to a rectangular shape:

1. The sides of the wedge (83 degrees left and right) are now sides of the B scope.
2. The entire bottom of the B scope represents 0 yards, and therefore the bomber.
3. The azimuth scribe line at 0 degrees, was the only scribe line not disturbed by the change from a wedge to a rectangular shape.

Therefore, only the area at or near 0 degrees in azimuth will present a true representation of an approaching aircraft's actions in relation to its position outside our bomber. The rest of the B scope presents a distorted representation. This distorted representation will affect target course lines to the point where skilled radar scope interpretation is necessary to determine the target's actions in relation to the bomber.

To avoid mid-airs, and near misses, it is extremely important that the gunner be able to interpret when an aircraft is changing altitudes toward the bomber's altitude. The C scope presents only the azimuth and elevation planes of the radar cone of coverage. It does not indicate how far above or below the bomber the aircraft is. It indicates only that the aircraft's relative position is high, level, or low. Using the C scope alone one cannot tell if the aircraft is climbing or descending, except for the instant the aircraft crosses 0 degrees of elevation. The following are a few examples of the flight paths seen most often.

In Figure 2a. we see a typical crossing target as it would appear on the gunner's scope. As the plane crosses from the three o'clock position, (or the extreme left of the scope) his range seems to be decreasing, but as it passes six o'clock and continues his range increases until we lose him at about eight-thirty.

Although it seems that if he is crossing straight behind us, his range should remain about the same, but remember, the distance from the tail of your B-52 to that aircraft is quite a bit longer when that aircraft is at your three o'clock position, than when it is at your six o'clock position. This is shown in figure 2b.

Figure 2a, and 3b depict what is known as the "predicted collision course". If the plane continues on his decending turn, he will eventually collide with the bomber. This could be a fighter coming in for the kill, or it could be a commercial airliner in a decending turn to a penetration.

In figures 4a, and 4b, we see what could be a lead collision, but turns out to be an aircraft passing below

From the radar cone of coverage in azimuth and range to the B scope

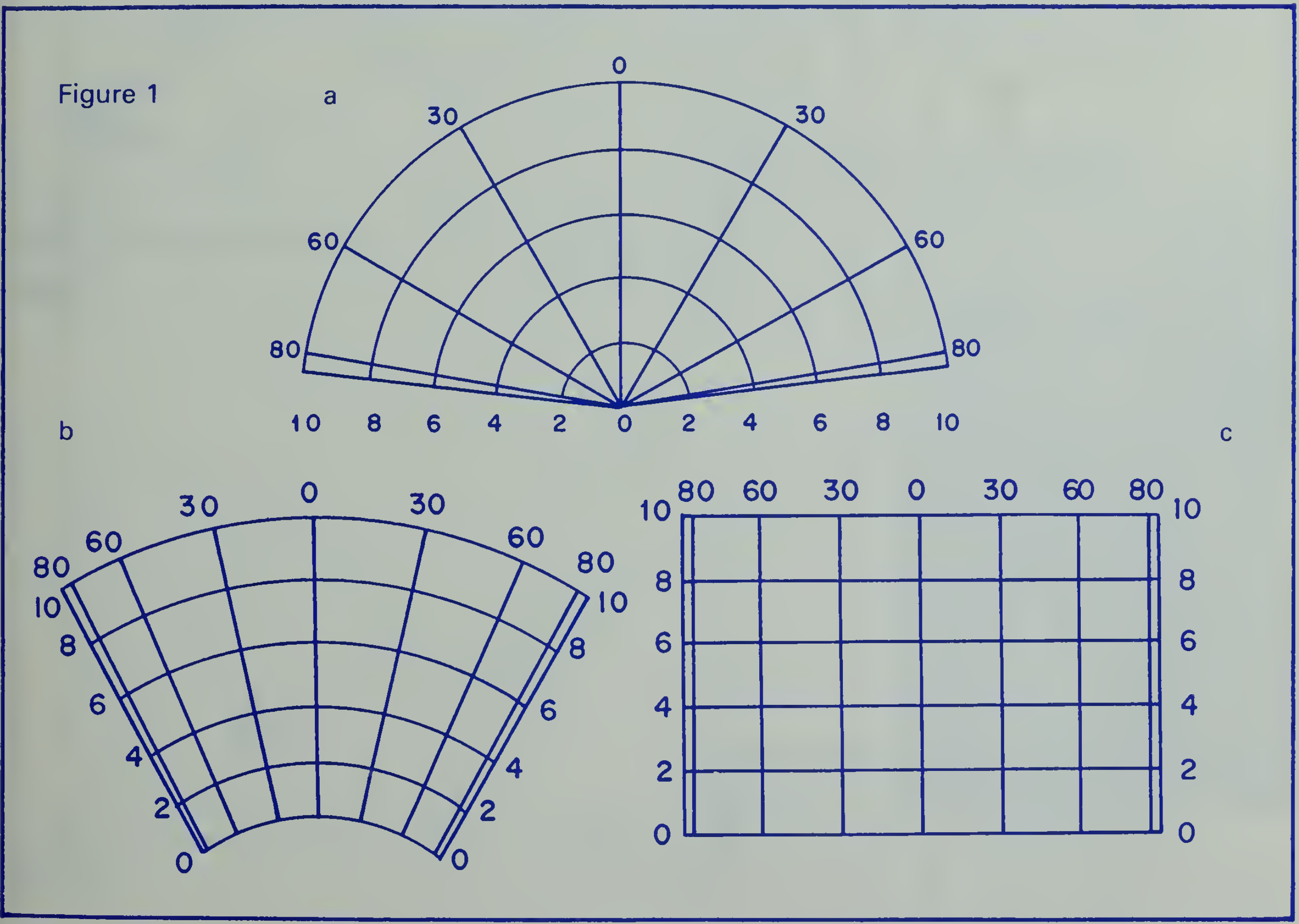


Figure 2

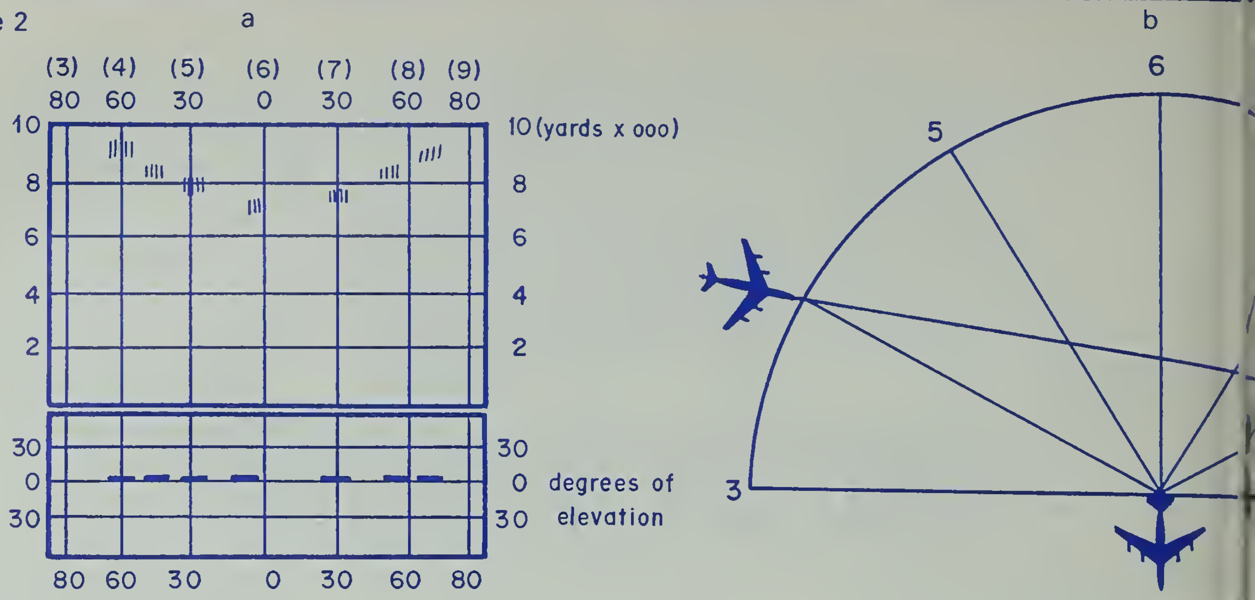


Figure 3

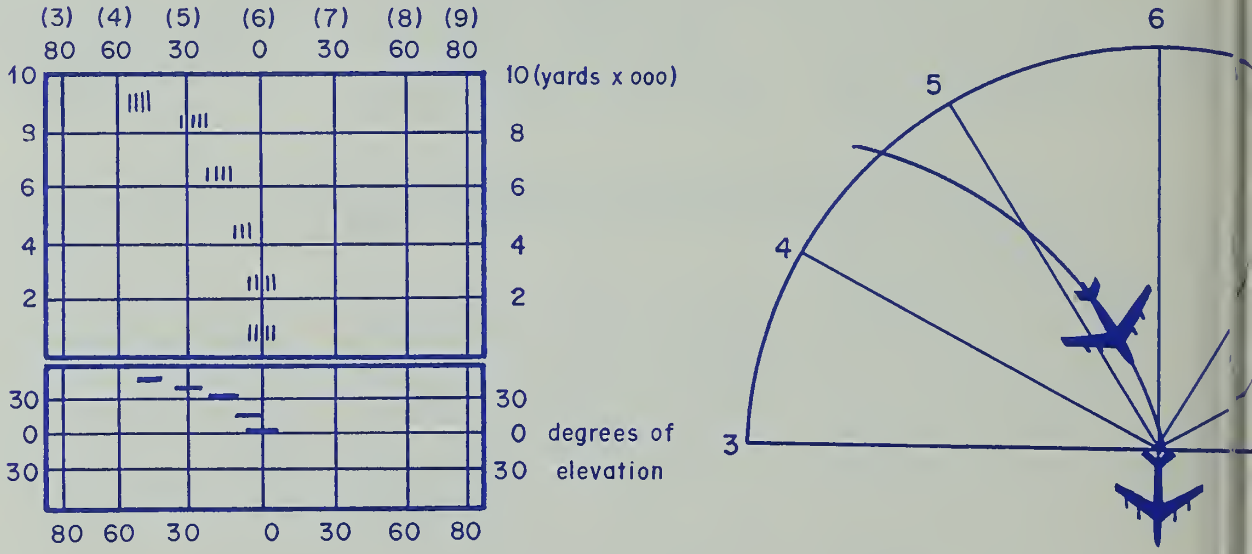
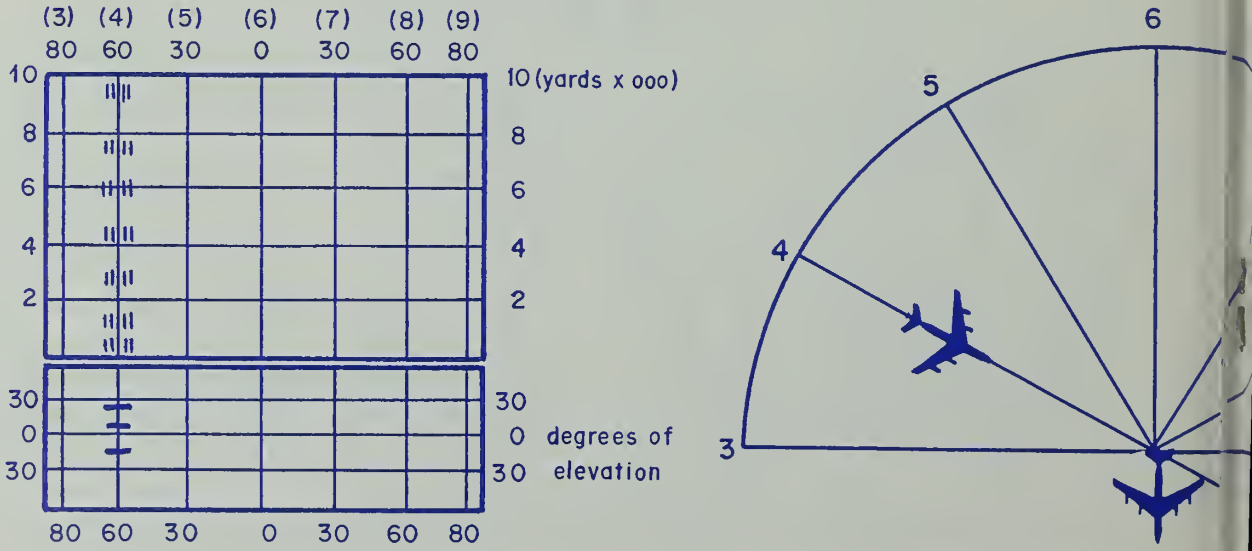
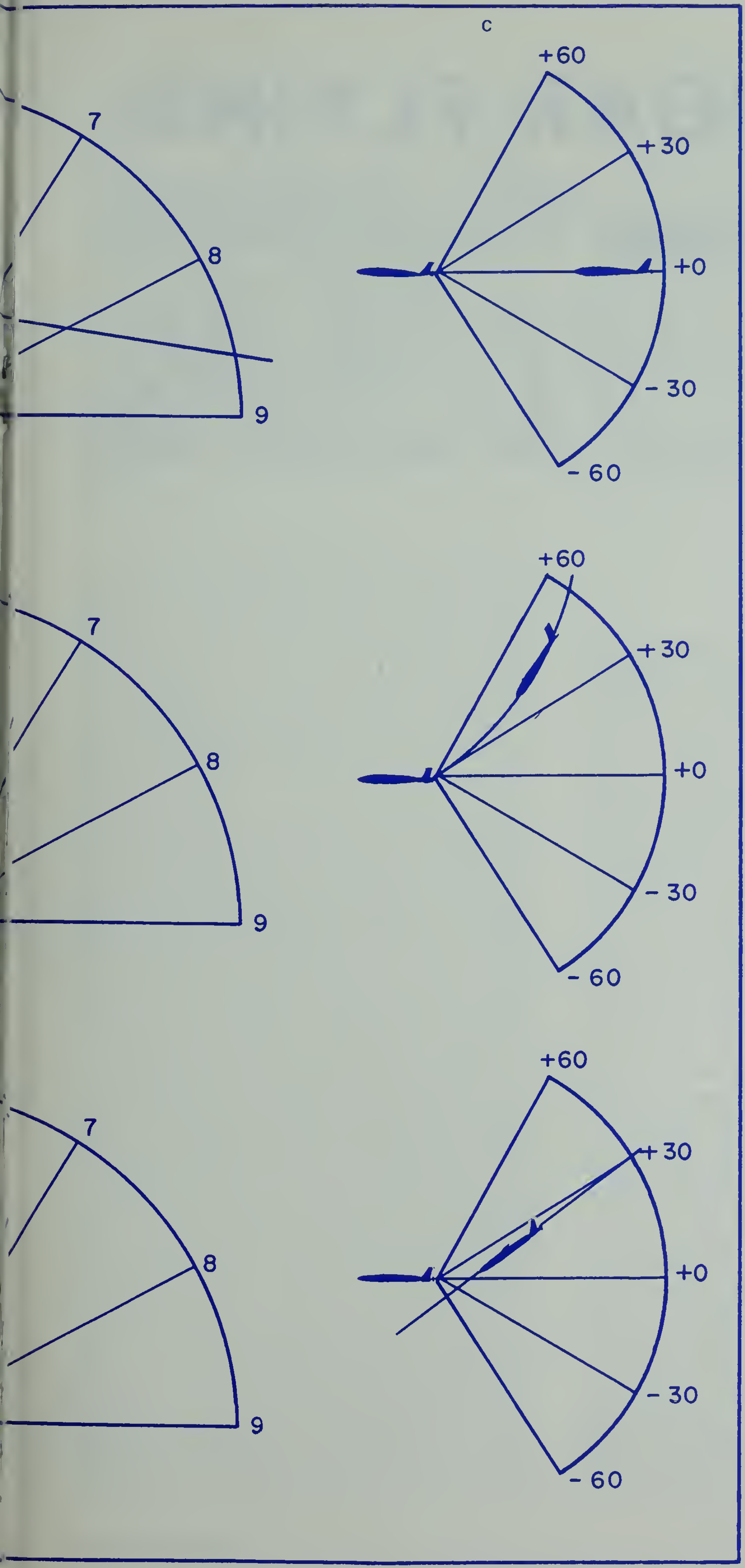


Figure 4





the bomber. Anytime an aircraft maintains constant azimuth, with decreasing range, it's going to hit you, provided that it's elevation angle also remains the same, but if that angle changes the aircraft will either pass above or below you. A wrong maneuver called at this point, could kill.

If all other T-1 trainer programs are like ours was, and I'm sure that there are quite a few, when you were scheduled for a T-1, you probably signed in, ran off a few target attacks, and called it a day. Well our T-1 program was revamped about six months ago, and a lot of scope interpretation was added. You would not believe the number of gunners that sit there in the trainer, and let another aricraft hit them without calling out any maneuvers. Our improved T-1 has alleviated this problem.

But good training is not enough. Each gunner must be able to realize the parameters of his equipment, and know when something is wrong.

A T-1 trainer program should have a good amount of scope interpretation incorporated into it, if yours doesn't, push for it; if it does, use it.

There is nothing more valuable to your pilot than an extra pair of eyes.

ABOUT THE AUTHOR.

Sgt Edward Ranzenbach, "Spanky" as his crew calls him, completed CCTS training at Castle AFB in July 1974. He was assigned to the 668 Bomb Squadron, 416BMW, Griffiss AFB where he is the gunner for Crew E-17.

HANGAR FLYING

CENTRAL FLIGHT INSTRUCTORS COURSE

Information in these articles is nondirective. The purpose of hangar flying is to share experiences and stimulate interest in safe, effective techniques. If you know a better way, send it to:

HANGAR FLYING
4018 CCTS/CFIC
CARSWELL AFB TX 76127

Tanker Autopilot Off — Gulp! When notified that his tanker has a broken autopilot the average B-52 pilot might become a bit apprehensive — he may even break out in a cold sweat. He now recalls the last time he refueled with the tanker autopilot disengaged and how he got into the "tanker-bomber rock" which resulted in a disconnect. With this experience in mind the bomber pilot approaches subsequent tanker autopilot off refuelings with a degree of caution. Some of the more common ideas which B-52 pilots have on how to handle this situation are:

> "I'm going to approach the tanker much slower than normal so he will have a chance to trim his aircraft." "I like to go into contact a little low because I know the tanker is going to move around quite a bit."

In our two previous articles we have addressed the tanker pilots on how they can help their receivers by making smooth corrections and by not trying to maintain a rigid platform. Now it is time to consider the B-52 side of the house to see if the receiver pilot need take any special precautions for a tanker autopilot-off refueling or if he can use normal refueling techniques. It will be our purpose in this article to generalize on some B-52 control techniques which will hopefully make the air refueling maneuver safer and easier for both aircraft. We will treat basically the same areas as the tankers did: pitch, lateral control and power.

Pitch — As explained in the previous "Hanger Flying" article, the airflow pattern over the tanker's horizontal stabilizer is flattened out as the bomber approaches the contact position. If this change in the downwash angle is not compensated for the KC-135 will incur a nose down pitching moment. The tanker pilot, therefore, induces small amounts of nose up stabilizer trim as the B-52 approaches 30, 20 and 10 feet from contact. However, these trim inputs are based on a normal closure by the receiver — not too high or low or unnecessarily slow. Perhaps the most uncomfortable approach for all involved (including the boom operator) is for the bomber to come in low and then "elevate" to make contact. This technique does no favors for the tanker pilot because it gives him a sudden pitch change which is very difficult to control smoothly.

Although some B-52 pilots intentionally make their closure above or below the desired elevation, others do so because they do not have a workable pitch reference. It has been observed that pilots who rely on the end of the boom to judge elevation will become somewhat erratic once they lose sight of this reference. For these pilots and for others who do not yet have a good pitch control reference, we recommend they try using the UHF antenna and row of dzus fasteners located on the underside of the tanker fuselage just aft of the director light panel. (This technique is good only for daylight refuelings, so at night try placing the tanker underwing lights at a spot in the upper portion of your number one windshield). By making an inverted "T" with the antenna and dzus fasteners (which, by command directive, will soon be painted over with a white line) you have a reference for approximately 30 degrees elevation. Using this reference you should be able to maintain a constant climb path from precontact all the way to contact position and give the tanker pilot a more pitch stable aircraft.

Consideration should also be given to your rate of closure in an attempt to avoid stagnation prior to reaching contact position. We have found it very helpful to take a little extra time in precontact to completely stabilize the aircraft and then note a fuel flow or reference throttle position. Adding approximately 1000-1500 pounds of fuel flow or correspondingly ½ knobwidth of power will usually provide enough momentum to drive the bomber into contact position at a comfortable rate. Once you have ascertained that you have a safe closure rate allow yourself to keep that power set until approaching contact. Contact position may be determined by using the coaching lights in conjunction with visual references such as the relative position of the boom and tanker inboard engine pods. Remember that constant rate of closure will also contribute to pitch stability of the tanker.

Lateral Control — It might help to take a look at the interrelated effects between the two aircraft which take place when the B-52 slides toward an azimuth limit.

Once established in contact, if the receiver starts to move from zero azimuth, the boom becomes a secondary rudder causing a yaw induced roll for the tanker. For example, if the receiver should move to the right azimuth the boom will correspondingly move right causing the unattended tanker to roll the same direction. The receiver then corrects back to center and the two airplanes get out of phase with each other's lateral control inputs resulting in the infamous "tanker-bomber rock." Obviously, the easiest way to prevent this situation is for the bomber to always stay in the center, but that's a bit unrealistic.

As explained in the last article, the tanker pilot can sure help things here by keeping a constant bank when the ol'BUF starts to slide around. And the B-52 pilot will help stay away from the "rock" if he can detect azimuth movements before they require large corrections. To accomplish this he will need some good lateral references. We have found it very helpful to use the tanker's engine pods and the underside of his inboard wing sections as a large "ADI." By visualizing this "ADI" across the top of your windshield you are able to detect the slightest roll tendency which can be corrected before encountering any significant lateral movement. This often requires the conscious use of peripheral vision. If you start to move to an azimuth try to just stabilize the aircraft and let it return to center by itself. Usually if the pilot attempts to stop the lateral motion and return to center with one control wheel input it will be too large resulting in an overshoot to the other side.

If, by chance, you do get into the "tanker-bomber rock" there is not much point in trying to maintain contact. This is a situation which increases in magnitude and could become potentially hazardous. You're much better off to get a disconnect, drop back to precontact and allow both aircraft to restabilize.

Power — It will help if you reference the March article for recommended KC-135 power techniques as this section will be a reinforcement of those ideas only from a receiver's standpoint.

On the CFIC flights we experiment with and analyze every phase of the air refueling platform with particular emphasis given to power techniques. We have not yet seen a B-52 instructor pilot (including our staff) who enjoys small throttle manipulations while the tanker pilot attempts to maintain a constant airspeed. Even small, unannounced throttle movements of ¼ to ½ inch on behalf of the tanker pilot will really move the B-52 around and force the receiver pilot into large power changes. For the B-52 pilot these large throttle movements cause problems, not only in his fore-aft position but also in pitch stability. Let's reemphasize that once the receiver reaches precontact position he is very dependent on his tanker to hold a constant power setting except for the offload power reduction. Any other tanker power changes should be called back to the receiver, i.e., "Receiver 45, reducing ½ knobwidth of power now." By giving this little courtesy call to the receiver he can anticipate the power change and move his throttles approximately the same while maintaining a stable position in the envelope. It makes sense that if the tanker pilot does not jockey his throttles unnecessarily then the B-52 pilot should be able to hold his position with very few and small power changes. Many bomber pilots agree that power is the "secret" to a good refueling platform but it is evident that it all begins on the throttle quadrant of the KC-135.

Summary — Many of the problems which are encountered during tanker autopilot off refuelings are indirectly the result of a lack of understanding of interrelated effects between the two aircraft.

The B-52 pilot need not take any special precautions as he approaches a tanker whose autopilot is inoperative, but rather should employ normal closure techniques. By making a constant rate closure at the proper elevation the receiver pilot will enhance pitch stability of the tanker. The use of good lateral references by the B-52 pilot will help reduce his azimuth corrections and avert a possible tanker-bomber wing rock. The tanker pilot's power techniques play a very important role in the overall stability of the formation. Except for the throttle decrease during fuel offload, the tanker pilot should tell his receiver whenever he makes a power change.

Air refueling, with or without the use of autopilots, is a maneuver which requires maximum coordination between the two aircraft. It's time for tanker and receiver pilots to start talking to each other about refueling techniques. The time to talk technique is not after the third disconnect, but on flight planning day when you come to that item on your mission briefing checklist entitled "cell formation procedures."

Tanker Task Force

continued from page 7

problem we positioned spares at the end of the runway and used compression within a cell only having the spare, if needed, going as "tail end charlie." We then selected lead qualified crews for number one and number two positions, thereby virtually guaranteeing that all cells would be led by "lead qualified" crews.

Another difficulty involved inaccuracies in wind forecasting over extended overwater routes and resultant rendezvous timing problems. Excessive headwinds on a redeployment caused the westbound Torrejon Orbit Force and receivers to run about 20 minutes late, with corresponding early arrival of the eastbound Loring tankers at the ARCP orbit. With 30 minutes between cells, it wasn't long before cells were arriving at the ARCP before the previous cell had departed downtrack. Two four ship tanker cells in the same orbit at the same altitude, during an attempted rendezvous with tankers and receivers from a second force, is much more exciting than it is safe. To positively eliminate chances of that ever happening again, separate upstream orbit patterns were established for each succeeding cell and cell leaders were required to verify by radio that the preceding cell had departed downtrack before entering the ARCP orbit. A timing triangle was also built into the last leg prior to the ARCP.

A third problem developed when adverse recovery weather prompted numerous wingmen crews from several cells to make premature decisions to divert. Tankers were scattered all over the East Coast. This problem has been corrected by using programmed cell backup procedures for more orderly aircraft recovery, tightened control of cell leaders over their cells, and required coordination with the task force commander or his representative prior to diversion. No effort is made to prevent the pilot in command from making the final decision or matters effecting safety of his aircraft and crew; however, uncoordinated action is permissible only in the event of a bonafide emergency.

A final and very important consideration in the success of a task force is the crew proficiency and discipline needed to fly quality formation. During World War II, the discipline of a flying unit was always judged by the formation they flew. Tanker task force operations have taken this criteria out of the past and made it applicable today. It's not easy because today's crews have limited experience, and there has been little specific formation training designated by directives. That is changing now. CINCSAC/DO Message 151708Z Oct 74 specifically directs training in cell departure and joinups and in tanker-on-tanker rendezvous procedures as used during task force operations.

We are going to beat this problem too, B-17 and B-24 veterans would be right at home during hangar flying sessions, where the discussions are swinging toward heading changes required for position correction, formation throttle techniques, grease pencil marks on the windshield for monitoring visual alignment, and techniques for being an effective cell leader. The crews are motivated about formation. They know you can't move receivers between tankers strung all over the sky, and sloppy throttle technique wastes fuel that we don't have.

We've learned a lot about task force operation at Loring in six months. We developed maintenance procedures, for instance, to expedite repair of aborting aircraft for use as spares or in subsequent cells. We developed shortcuts to prepare and reproduce latest-wind flight plans faster and more accurately. We developed much more effective means for the task force commander and his staff to monitor and control the mission from the MCA aircraft by using a special control console and abbreviated formation fuel logs.

Some of these would be magazine articles in themselves. Instead of going farther into the subject here, why not grab yourself a TDY to Loring and we'll show you a first class tanker task force operation. But when you depart your sunny home drome, don't pack your "long handles" — wear them!

ABOUT THE AUTHOR

Colonel Patterson is Deputy Commander for Operations of the 42nd Bomb Wing, Loring AFB, Maine, and was host unit DO for all the tanker task force missions described in the article. He is currently qualified in both the B-52 and KC-135. Colonel Patterson has a highly varied staff background including B-52/KC-135 mission development, mission director and airborne commander for B-52 strike missions in Southeast Asia, staff research and development engineer on the Pentagon Air Staff, and Senior Advisor for Strategic Arms Limitation (SALT) agreements to the Arms Control and Disarmament Agency, Washington DC.

CINCSAC COMMENTS

Continued fromm Page 3

provide the best single indication I know to establish potential; i.e., **to be the best there is in your assigned duty.** No longer will rampant OER inflation force selection boards to resort to indications of job diversification, PME and advanced academic education to serve as the "tie breakers" in considering who to promote. In the new OER concept, the principal determinant of every officer's evaluation is "how well is he or she doing the job assigned?" If the best — you can be assured of recognition . . . and you will have established the very best basis for demonstrated potential.

All of the jobs in our command are critical. We in SAC don't do the whole job, of course — but it can't be done without us. So it is with our crews. This command cannot perform its mission unless everyone — from Commander to Chock Puller — does his or her job well.

Yet . . . the combat crews' ability to launch our missiles, provide aerial refueling, perform strategic reconnaissance, and put bombs on the assigned targets is what we are all about. If the combat crews fail, we all fail. That makes it incumbent upon all of us to offer the proper support and incentive for reasonable advancement to those who work "Where it's at." And to encourage retention on crew duty for a sufficient period to be confident of our crews' experience and competence. I know that; our Air Force Chief of Staff, General Jones, knows it; the SAC Commanders know it — **and the Air Force promotion boards will know it.**

Having made this principal point, I want to emphasize that I do not belittle the other valuable aspects of professional development. A professional officer worth his or her "salt" has two fundamental tasks to perform at all times in his or her career. The first of these is to be the very best possible professional performer in his or her present duty; the other is to prove capacity, potential and ambition through doing more and better than the minimum acceptable standards demand. For combat crews, the individual investment and dedication required makes this duty very demanding; but, a crew officer still has the responsibility to prepare for the future — the next job, the next situation, the next challenge. We must recognize there is no way of knowing exactly what that job will be and we can't be precise in preparing . . . but you can't go wrong if you **are the very best** in your primary duty.

Formal academic education, professional military education and career broadening experiences and assignments are extremely valuable in increasing one's potential — there is no denying that, and I would not want to see them discounted or derogated . . . but, I repeat, when done in conjunction with another primary duty — **these things are not ends unto themselves** and we shouldn't think of them as such.

And . . . in our environment, the combat crew member does not have to get out of crew duty in order to further these desirable ancillary enrichment goals. Every base in SAC offers a Masters degree of some type as a part of its on-base educational program. PME from Squadron Officers School through War College can be completed by correspondence or through on-base seminars. And if you want to learn more about Air Force Personnel, Logistics, Security, Transportation, Finance, Engineering, Procurement or other facets of Operations while you are assigned combat crew duty, I can almost guarantee that your Squadron and Wing Commanders will be eager and able to arrange for you to become exposed to some aspects of these specialties as additional duty that will be useful for you and valuable to your unit.

In the Air Force of the future, it is almost axiomatic that our combat crew members will be forced to learn more, to experience more, with less actual crew experiences — particularly flying crew experience. Let me urge those of you on combat crews to take every advantage of this opportunity you have for fundamental combat crew experience — experience that will increase your potential value, establish you as an experienced combat crew member, and remain of great professional value to you for as long as you are an Air Force Officer. Remember, there is a world of difference between those who merely know how to fly, control missiles, navigate, pump fuel, distinguish electronic signals, fire guns, operate cameras, or load cargo — and **those who truly are experienced professional crew members, instructors and evaluators.** The former is merely a technical specialist — the latter a true military professional, who does and has extracted the most from his valuable crew assignments — whose composite skills, experience, dedication, and knowledge constitute the bedrock of the professional Air Force — and the essential foundation for assuring that we remain the most professional, dedicated and powerful military command ever assembled.

No officer in SAC will be penalized for being a combat air or missile crew member if he is determined to — and does — excel at it!

PROFESSIONAL

FLYING CREW

Crew R-14, 43 SW, Andersen AFB: (Left to right, top row) Capt Erik L. Foged, radar navigator; SMSgt Arthur H. Pollard, gunner; Capt Bruce E. Hite, EWO; (left to right, bottom row) Capt John E. Boyd, pilot; Capt Charles D. Dill, copilot; Capt Michael B. Manning, navigator.

TITAN Crew R-080, 381 SMW, McConnell AFB: MCCC Capt Michael J. Duffee, DMCCC 2/Lt Larry D. Sullivan, MSAT A1C Douglas H. Kiel, MFT A1C Charles R. Warren.

PERFORMERS

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence as outlined in SACM 127-2.

Maintenance Man. SSgt Ernest L. Wiatrek, 42 Avionics Maintenance Squadron, 42 BMW, Loring Air Force Base.

MINUTEMAN Crew E-53, 341 SMW, Malmstrom AFB: MCCC Capt Fred F. Littlepage, MCCC 2/Lt Steven D. Anderson.

OTSL TRAINING TOPICS

... A SYNOPSIS OF NEW PROGRAMS FOR SAC AIRCREW TRAINING

We have just completed a three part course designed to provide newly designated instructors with a basic background in the role and duties of an instructor. The three programs should be accomplished in the following sequence:

(1) Lesson Planning (sound/slide).
(2) Teaching Techniques (videotape).
(3) Training Aids (videotape).

This is not intended to replace the on-base instructor course conducted by the ATC travel team, but should be used as an interim measure until this training can be received. We're sure your new instructors will find it invaluable and maybe you "old heads" could learn something.

Here are our most recent videotapes from our television studio. (NOTE: Programs are unclassified unless otherwise so stated.)

1. "Crash Survival" — Brigadier General William W. Spruance (Ret), Delaware ANG, emphasizes through his personal experience the use of protective equipment and training to enhance your chances of survival in both aircraft and automobile crashes.

2. "MIJI" — A SECRET program covering the detection and recognition of hostile and non-hostile navigation and communication interference.

3. "KC-135 Fuel System Review, Part IV" — A review of the components and operation of the air refueling system. Included is a discussion of crew coordination required for normal and emergency system operation.

4. "Training Aids" — discusses the objectives, characteristics, and use of well designed training aids. This is primarily intended for newly designated instructors.

We have several shows currently in production that should be of great interest to you. "Command and Control" will simulate the execution of the Emergency War Order and present the interaction and response of all the individuals and agencies involved. For you B-52G and H units that will be receiving the Automated Offset Unit, we will be providing you with a videotape in early June that will explain the operation of the system. It will also discuss some of the other capabilities of the digital computer.

Our sound/slide section has been busy supporting the ISD branches of the three CCTSs. However, the two programs we promised you last month are now in the field. They are:

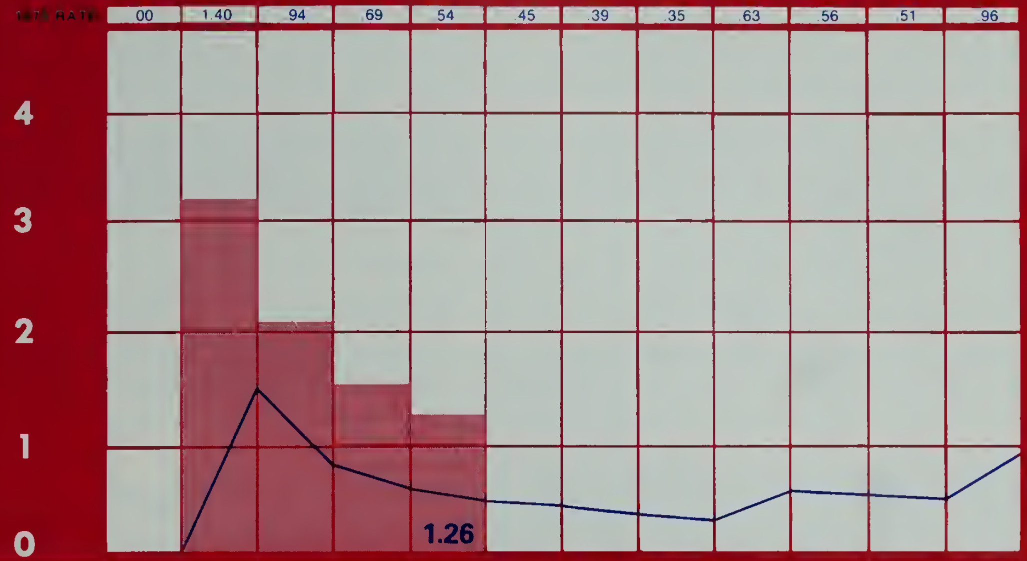
1. "Arctic Survival" — discusses procedures and techniques to be used in Arctic survival situations while awaiting rescue. It's intended for use in LST-3.

2. "Lesson Planning" — discusses objectives, outlining, formats, and helpful hints for lesson plans.

Two programs, MITO procedures and Electronic Warfare Principles (EWP), are being produced incorporating both sound/slide and videotape in presenting the material. These programs should be released soon. Remember, all the OTSL branch and section phone numbers are available in our catalog, so if you have a request or an idea, contact the appropriate area for consideration.

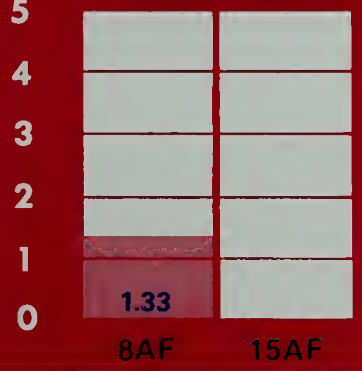
1976 Flying Safety Rate

SAC MAJOR ACCIDENT RATE (PER 100,000 FLYING HRS)



ACCIDENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	0	1	0	0	0	0	0	0	1	0	0	2
1976	0	2	0	0	0							

1976 SUBORDINATE CMD RATES



ACCIDENT STATUS

KC-135	FEB 76
FB-111	FEB 76

LEGEND ─ =1975 RATE

BIG INSTRUMENT

Captain Stephen E. Smaby, 1CEVG

ATC AND LOW LEVEL OPERATIONS

As the airspace over the United States becomes more congested, the problems of handling and sequencing air traffic becomes more complicated. Aircrews can help alleviate some of these problems for ATC by a thorough understanding of the special military operations and their relationship to ATC requirements. This article will discuss one particular military operation — low level activity — and its relationship to ATC requirements.

We are concerned with two types of low level operations in SAC: Olive Branch (IFR) routes and VFR low altitude training routes (TR). Special procedures are required to coordinate these operations with ATC. ATC is primarily concerned about the routing and timing to the entry fix and the routing and timing after exit fix. The military has responsibility for all operations within low level routes. In order to make a smooth and safe transition from normal enroute procedures to military operations and back again, the aircrews must coordinate closely with ATC for each low level activity.

Olive Branch routes are more frequently used than TR routes. These routes provide you with an IFR clearance for a route which can be flown under instrument meterological conditions. Even though you may be cleared as filed prior to takeoff, you still must have an inflight clearance to fly the "route and altitudes." This requires that ATC know your entry time. ATC also needs to know your exit time for proper sequencing of your flight back into the enroute system.

While the military has responsibility for low level operations, it may be necessary to contact certain ATC facilities along the route. These mandatory reporting points are designated in the route description in FLIP AP/1B. They can be designated along the route (Figure 1), or on the exit routing as a position (Figure 2) or an altitude (Figure 3). It is important to comply with these reporting points since it provides ATC with information needed for traffic coordination. In the case of the reporting points on the exit from low level, they provide ATC with your position so that you can be properly sequenced back into their traffic flow.

TR routes are handled differently by ATC. Prior to entry into the TR route you will transition from an IFR clearance to your VFR clearance as prescribed in SACR 55-3. This means that you will have to pick up your IFR clearance again after you exit the route. ATC needs to know your entry point and time, and your exit point and time so that they

FIGURE 1

Direct so as to cross 36°50′30″N 83°30′00″W, (Primary Entry Point) at 5000′ MSL; then at 5000′ MSL direct to 36°42′30″N 84°10′00″W; then descend direct so as to cross 36°40′N 84°21′W at 4000′ MSL; then at 4000′ MSL direct to 36°36′N 84°40′W; then at 4000′ MSL direct to 36°32′N 85°15′W; then descent direc[illegible]o as to cross 36°32′N 85°21′W at 2500′ MSL; then a[illegible]0′ MSL direct to 36°31′N 85°40′W; then turn right to [illegible]N 85°49′W; then at 2500′ MSL direct to 37°16′N 85[illegible] *(Contact Bowling Green FSS on 255.4 MHz passing 37°00′N)*; **then climb direct so as to cross 37°24′00″N 85°44′30″W at 4000′ MSL; then at 4000′ MSL turn.**

FIGURE 2

Maneuver Area — After passing 38°31′N 118°12′W, aircraft shall maintain 13,000′ MSL through the maneuver area (38°3[illegible] 118°12′W to 38°30′N 118°44′W). After exiting t[illegible]ute at 38°30′N 118°44′W, aircraft shall turn left an[illegible] so as to cross 38°22′N 118°52′W at 15,000′ MSL; *[illegible]ontact Oakland ARTCC on 319.8 MHz after passing 38°22′ N 118°52′W)*; **then at 15,000′ MSL direct to 38°13′N 118°51′W; then at 15,000′ MSL turn left to 38°08′N 118°41′W; then climb direct so as to cross 38°09′N 118°13′W at 17,000′ MSL; then at 17,000′ MSL turn right to 38°08′30″N 118°09′00″ W (Coaldale, NV VORTAC 278/20 NM DME Fix); then at 17,000′ MSL direct to the Coaldale, NV VORTAC (38°00′ 12″N 117°46′10″W).**

FIGURE 3

Maneuver Area — After passing 42°54′00″N 117°09′30″W, aircraft shall maintain 8000′ MSL through the maneuver area (42°54′00″N 117°09′30″W to 43°51′N 117°08′W); after exiting the route at 43°51′N 117°08′W, aircraft shall maintain 8000′ MSL and then turn left to 43°56′N 117°24′W; then at 8000′ MSL direct to 43°40′N 117°53′W; then turn left and climb to 43°34′N 117°57′W; then continue climb direct s[illegible] to cross the Rome, OR VORTAC (42°35′26″N [illegible]02″W) at 15,000′ MSL or as assigned by Salt Lake A[illegible]. *(Contact Salt Lake ARTCC on 307.0 MHz leaving 8000′ MSL).*

can properly coordinate your flight with other traffic. Although ATC does not control your entry into the TR routes, you are required by FLIP-AP1B to call the Flight Service Station (FSS) nearest the point of entry with an entry report (Figure 4). Even though this report does not require you to pass your exit time, a good operating technique is to coordinate the time you expect to pick up your IFR clearance with either ATC or FSS prior to the entry into the route. This will expedite the receipt of your IFR clearance when you exit and will provide ATC with a time they can expect to sequence your flight back into their traffic.

FIGURE 4

Communications:

1. **Pilots will contact the FAA FSS/IFSS nearest the point of entry of the VFR Low Altitude Training Route on 255.4 MHz and provide the following information:**
   - **a. Call sign — low level**
   - **b. Route, point of entry and proposed entry time.**
   - **c. Exit point**

Most of the information that is required by ATC for low level operations is contained in the remarks section of the SAC Form 207. However, we have all experienced the proverbial maintenance delay which considerably changes your flight plan. This requires a flight plan change to include your new entry and exit times for low level operations. It has been observed that some crews are under the impression that they are cleared for all entry times associated with bomb release times on Olive Branch routes. This is true in regards to being conflict free of other traffic along the route, but is not true for ATC clearance. Since ATC controls entry into Olive Branch routes, you must notify them of changes to your entry time and this should be included as a remark with any flight plan change.

A cooperative attitude exists between ATC and the aircrews; however, to maintain this cooperation, it is important to know the relationship of ATC requirements to special military operations. Equally important is the requirement to keep ATC informed of any changes to your flight plan so they can provide the service you need, when you need it.

OPS HAZARDS

HEY SARG! DO YOU REMEMBER THAT TECH ORDER I WAS SUPPOSED TO READ? WELL IT PAINS ME TO TELL YOU THIS BUT.....
SAFETY
REMINDER

ONE MORE TIME . . . We can often make one mistake and still salvage a bad situation. When we make two, three, and more, our odds go down rapidly. Witness a recent fighter aircraft maintenance scene.

The fighter needed some sheet metal work in the nose wheel well. Man number 1 took man number 2 (a less experienced technician) along to help. They had no tech orders or lift jacks with them like the rules say, but they did not need to remove the nose gear. They found that access to the repair area would be easier if some hydraulic lines were removed. They also found that the drag link assembly nut hindered the removal of the lines, so they removed the nut.

About then, man number 1 was called to a higher priority job and man number 3 (inexperienced) came to help. Man number 1 says he told them not to remove the drag link bolt or the nose gear would collapse. After he left, they did, and it did — fatally injuring the number 3 man. The airplane stood precariously balanced for nearly 40 minutes in spite of people crawling around and on it, before it fell, but too many mistakes had been made to allow recovery.

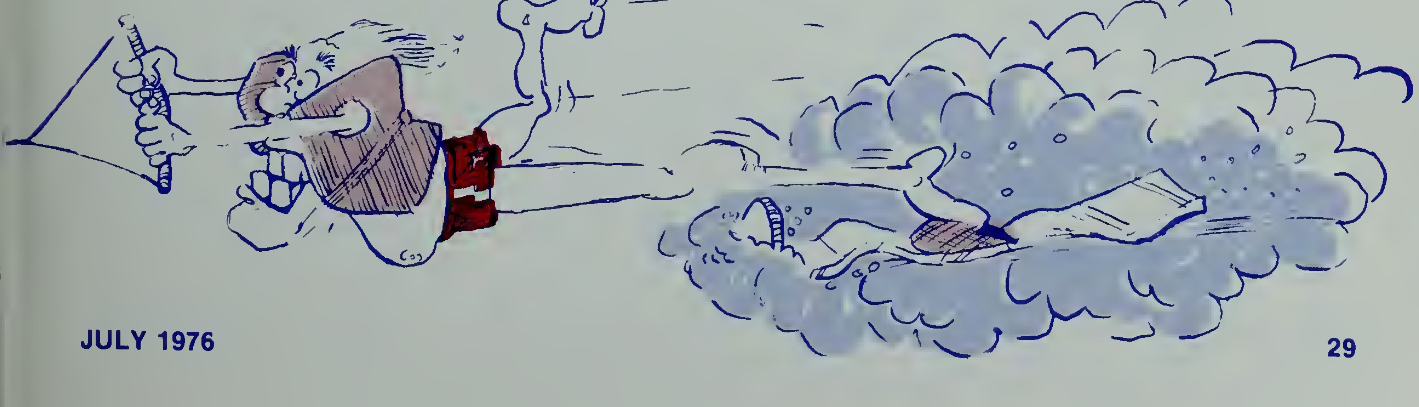
The lessons here of job qualification, tech data compliance, and communication are elementary and have been often stressed, but nevertheless, it happened **one more time.**

SUMMER

Enough can't be said about the dangers we all face during the summer months. Illustrated here are only a few of the potential hazards caused by inexperience and carelessness but the possibilities are endless. An accident can happen anywhere and at anytime so what ever your summer plans are, use good judgment be sure you are physically fit for the activity, learn and observe the rules of safety, and be alert to potential dangers. With these things in mind we all can have a safe and enjoyable summer.

Illustrated by SSgt Wayne Sealy and A1C G.F. Moriarty

SAFETY



HALL OF FAME

TACTICAL FLYING

OVER SIXTEEN YEARS

916 AREFS, Travis	Sep ’59
97 BMW, Blytheville	Mar ’60

OVER FIFTEEN YEARS

410 BMW, K. I. Sawyer	Oct ’60
19 BMW, Robins	Oct ’60

OVER FOURTEEN YEARS

11 AREFS, Altus	Feb ’62

OVER THIRTEEN YEARS

301 AREFW, Rickenbacker	Jul ’62
96 BMW, Dyess	Aug ’62
449 BMW, Kincheloe	Aug ’62

OVER TEN YEARS

320 BMW, Mather	Jul ’65

OVER NINE YEARS

92 BMW, Fairchild	Feb ’67

OVER EIGHT YEARS

55 SRW, Offutt	Jul ’67
2 BMW, Barksdale	Aug ’67
319 BMW, Grand Forks	Dec ’67
22 BMW, March	Feb ’68

OVER SEVEN YEARS

5 BMW, Minot	Feb ’69

OVER SIX YEARS

42 BMW, Loring	Oct ’69
93 BMW, Castle	Nov ’69
28 BMW, Ellsworth	May ’70

OVER FOUR YEARS

7 BMW, Carswell	Mar ’72
416 BMW, Griffiss	May ’72

ICBM

OVER TWELVE YEARS

381 SMW, McConnell	Nov ’63

OVER ELEVEN YEARS

90 SMW, F. E. Warren	July ’64
1 STRAD, Vandenberg	Sep ’64

OVER TEN YEARS

308 SMW, Little Rock	Aug ’65

OVER SIX YEARS

341 SMW, Malmstrom	Apr ’70

To gain listing in the Hall of Fame, a SAC unit must be accident-free for 48 months.

SAC Safety Screen

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW SACR 127-2.*

68BMW, Seymour Johnson Crew R-105: P Capt Ronald R Ememheiser, CP 1Lt Harry C Lanier, N Capt Gregory L Ainslie, BO SSgt Ray N Templeton

410BMW, K. I. Sawyer Crew E-12: P Capt Lawrence A Loeffler, CP-1 Capt Richard A Snyder, CP-2 1Lt Richard M Zimmerman, RN Capt Lawrence F Kraut, N 1Lt William E West, EWO 1Lt Russell H Salberg, G Sgt Randal R Sfakis

19BMW, Robins Crew E-109: FP Capt Richard W Mason, CP 2Lt Jesse V Kukier, IN Capt Charles S Romes, IS TSgt George E Dion Jr

19BMW, Robins Crew R-04: P Capt Eddie K Traylor, CP-1 Capt Ronald W Agin, CP-2 Capt Charles A Saxon, NB Capt Charles R Asher, NN 1Lt Ralph B McIntyre Jr, EW Capt Robert A Damron, AG SSgt Dwight W O'Quinn

7BMW, Carswell Crew E-126: P Capt David S Martin, CP 1Lt Richard D Poteet, N Capt Thomas L Adams, BO SSgt Ronald P Burzychi

5BMW, Minot Crew R-120: P Capt Gerald A Heater Jr, CP 1Lt Randall D Miller, CP 2Lt John P Mendoza, NN 1Lt Robert A Burgess, BO SSgt James B Stevens

22BMW, March Crew E-113: P Capt Douglas W Moser, CP 1Lt John G Kelly Jr, NN Capt Charles M Popp, BO SSgt David J Crowder

92BMW, Fairchild Crew E-117: P Capt Roy L Smith, CP 1Lt Charles R Shuffler, NN Capt Dennis L Mathias, BO A1C Mickey L Bright

96BMW, Dyess Crew E-121: P Capt Gerald W Roark, CP 1Lt Kenneth J Riley, NN 1Lt David K Bearden, BO Amn Dennis W Cason

100SRW, Davis-Monthan Crew S-60: P Capt William L Daws Jr, CP Capt Brian L Haggerty, NN Capt John Ozalins, LCO-1 Capt Larry P Landry, LCO-2 Maj Lyndell E Ross, ARCO Capt Richard T Parady, FE SMSgt William W Peterson, ART Sgt James G Shelman

916AREFS, Travis Crew S-101: P Capt Ronald M Zeimmer, CP 1Lt David J Whitney, NN Capt Raymond R Hammer, BO SMSgt Irving S Reid

44SMW, Ellsworth Crew E-194: MCCC Capt Robert H Priest, DMCCC 1Lt Stephen D Griffith

90SMW, F. E. Warren Crew S-126: MCCC 1Lt James E Webber, DMCCC 2Lt Roger D Coats

91SMW, Minot Crew R-065: MCCC 1Lt Eddie E Hollins, DMCCC 2Lt Rudolph H Bernhard

308SMW, Little Rock Crew E-155: MCCC Capt Robert G Johnson, DMCCC 1Lt Jerry D Fager, MSAT Sgt Phillip M Johnson, MFT Sgt Hector Portela Jr

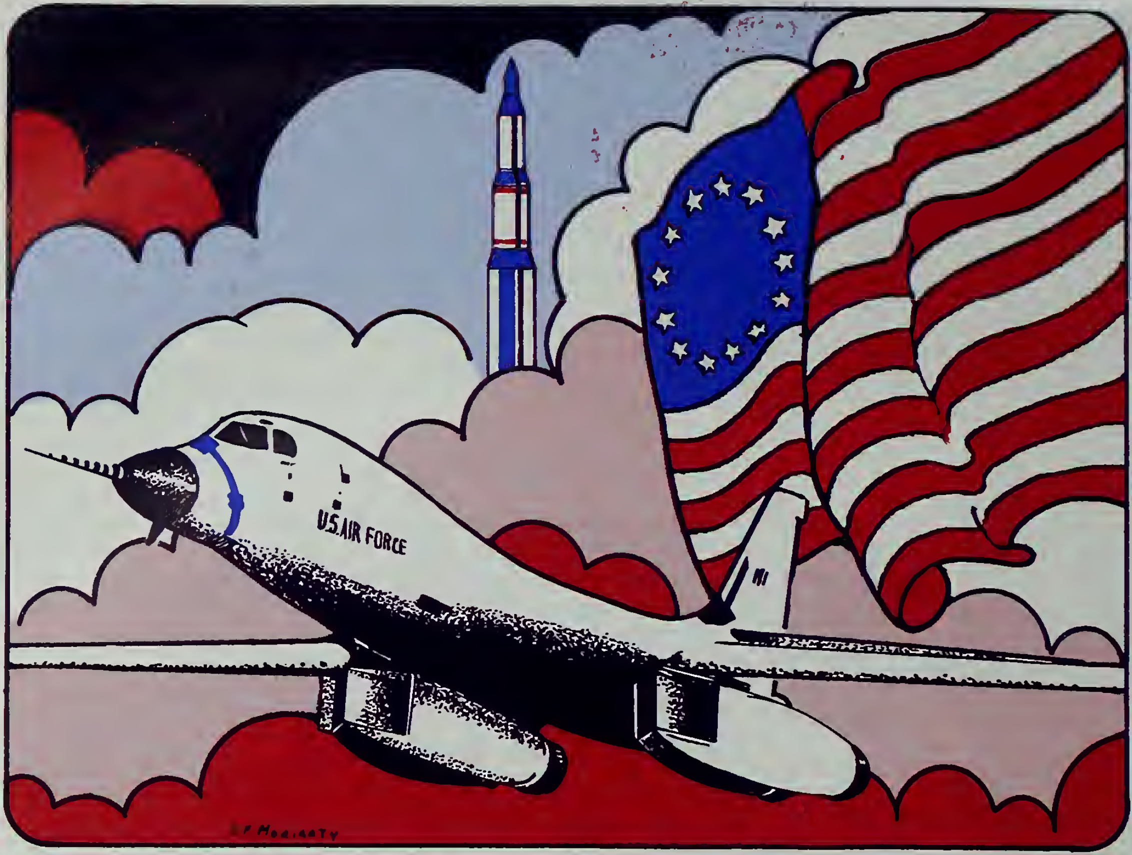
321SMW, Grand Forks Crew E-089: MCCC Maj Dennis B Gorder, DMCCC 1Lt Francisco J Ibero

351SMW, Whiteman Crew R-086: MCCC Capt Lamberth W Blalock Jr, DMCCC 1Lt Henry G Moreman III

U. S Government Printing Office
1976-665-702/11

FLARE

UNIVERSITY OF FLORIDA
3 1262 09304 8428



IN THE SPIRIT OF '76

When our country was in its infancy, the American patriot was the one who determined our future. He was the one who suffered many hardships and made the difficult decisions that were so important and pressing at that time. He was also the one who, at a critical time in our history and certainly a critical time in his personal life, was able to take the proper action and display the intense bravery that brought freedom to our country. He advocated independence and took the required action to back up his convictions. Over the last two centuries we have benefited a great deal from the contributions of the early American patriot. Our country has also benefited a great deal from the many patriots that followed.

As the Strategic Air Command began to form in the mid nineteen forties, the security of our country's freedom became dependent on another American patriot. It was the original SAC crewmember who set the high standards for a series of patriotic and heroic actions which took place regularly over the next three decades — actions that will continue into the future. From day one of SAC alert, American patriots have been maintaining a clear deterrent posture and making the associated personal sacrifices so that other Americans could lead more normal lives. Even before our alert commitment was initiated SAC crewmembers were making, and have continued to make, significant contributions to the defense of our freedom. This has often required endless months and even years away from their families. Today, the SAC crewmember is ready to meet any new challenge that threatens our freedom.

In the future our nation's dependence on the patriot will not diminish. It will probably increase. His importance will come into vivid focus when we are again challenged in the world arena. The American patriot of the future may have a different education, life style and standard of living from that of the patriot of 1776, but he will be the same kind of American. His action will insure our freedom.

Lt Col Richard W. Blatter
Editor